

Geographic variation in the volatile leaf oil of *Juniperus occidentalis*. II. Analysis from throughout its geographic range

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ABSTRACT

Volatile leaf oils of *J. occidentalis* were analyzed from throughout its range. The major differentiation found was the divergence of the Trinity Alps, California population from other *J. occidentalis* populations in having a high amount of sabinene (20.4%) and only a trace of bornyl acetate. Minor variations in the oil compositions were found, these being chiefly on the margins of the range of the species, except for the Burns, Oregon population. The oil of *J. occidentalis* f. *corbetii*, a shrubby form that occurs about 30 km east of Bend, Oregon, was somewhat distinct in having large amounts of p-cymene (20.0%) and bornyl acetate (24.5%). Published on-line www.phytologia.org *Phytologia* 97(4): 265-270 (Oct 1, 2015). ISSN 030319430.

KEY WORDS: *Juniperus occidentalis*, *Juniperus occidentalis* forma *corbetii*, Cupressaceae, terpenes, geographic variation.

Juniperus occidentalis, *J. grandis* (= *J. occidentalis* var. *australis*) and *J. osteosperma* are three very closely related junipers in the western United States (Vasek 1966; Adams 2011). Adams and Kauffmann (2010a) and Adams (2012a) reported on the geographic variation in the leaf oils and DNA of *J. grandis*, *J. occidentalis* and *J. osteosperma*. Recently, Adams (2012b) examined the leaf oils of *J. occidentalis* f. *corbetii* from east of Bend OR and presented a small study of geographic variation in the leaf oils of *J. occidentalis*. Hybridizations between *J. grandis*, *J. occidentalis* and *J. osteosperma* have been examined by Vasek (1966) and later by Terry et al. (2000) and Terry (2010) using DNA markers and morphology. Analysis of hybridization using leaf terpenes at Leviathan mine, Nevada (Adams 2013a) and Buffalo Hills, northwestern Nevada were recently published by Adams (2013a,b).

Juniperus occidentalis is a narrowly distributed species, growing largely east of the Cascade Mtns. and thence into nw California, eastern Idaho and northwestern Nevada (Fig. 1).

The purpose this paper is to report on a comprehensive analysis of geographic variation in the leaf essential oils of *J. occidentalis*. The reader is referred to Adams (2013a, b) for a summary of the hybridization between *J. occidentalis* and *J. osteosperma*.